

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 10-12, 15-18, and 20-27 are pending in this application. Claim 19 has been cancelled without prejudice or disclaimer in this reply. Claims 10 and 21 are independent. The remaining claims depend, directly or indirectly, from claims 10 and 21. Claims 10 and 21 have been amended in this reply to clarify the present invention recited. These amendments are fully supported by the original specification (see, for example, page 16, lines 19-27) and no new matter has been added. Also, these amendments are believed not to require further search.

Information Disclosure Statement

The Examiner has noted that the Information Disclosure Statement filed May 25, 2005 fails (in part) to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance of each patent listed. However, Applicant respectfully notes that a translated Office Action was submitted, noted at BC, with the Information Disclosure Statement of May 25, 2005. The Office Action cites the documents the Examiner has currently marked as not having been considered. Additionally, the Office Action details the relevance of each of these non-English references. Accordingly, Applicant respectfully requests full consideration of all references listed on the Information Disclosure Statement of May 25, 2005.

Objections

Claims 15 and 21 have been objected to for minor typographical errors. Claims 15 and 21 have been amended in this reply. Accordingly, withdrawal of the objections is respectfully requested.

Rejection(s) under 35 U.S.C. § 112

Claim 19 was rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claim 19 has been cancelled in this reply. Thus, this rejection is now moot.

Claim 19 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 19 has been cancelled in this reply. Thus, this rejection is now moot.

Rejection(s) under 35 U.S.C. § 103

Claims 10, 11, and 16-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent No. 6,155,376, issued to Cheng (“Cheng”), in view of U.S. Patent No. 5,000,636, issued to Wallace (“Wallace”). Claim 19 has been cancelled in this reply. Thus, the rejection of claim 19 is now moot. Claim 10 has been amended in this reply to clarify the present invention recited. Claims 11, 16-18, and 20 depend on claim 10. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

Applicants have discovered, through detailed experiments and studies, that a presser member may loosen due to impacts and vibrations in an electrically driven power steering apparatus. According to claim 10, as amended, the presser member has a connecting device to limit the relative rotation between the presser member and the ball screw nut, even if a bonding force between the threads is lost, wherein the function of limiting a relative rotation is performed after the threads are fastened.

Cheng discloses a lock nut (80). The lock nut of Cheng does not stop a relative rotation of the lock nut if a thread thereof loosens. Cheng is completely silent with respect to limiting relative rotation as now claimed. Cheng does not show or suggest a connecting device capable of limiting a relative rotation between the presser member and the ball screw nut despite loss of bonding force between the threads by means of a shearing force of resinous material that could serve as a filler coated on the threads of the presser member. Further, Chang fails to show or suggest the limiting a relative rotation being performed after the threads are fastened, as recited in independent claim 10, as amended.

Wallace discloses a thread on which a filler is coated prior to assembly of the thread. The thread of Wallace performs a function of limiting a relative rotation *as the thread is fastened*. This creates a problem where a fastening torque limits a rotation prevention allowance torque. Moreover, the rotation prevention allowance torque may be changed in accordance with a fastening condition (*e.g.*, a temperature, fastening method, etc.) so that it is difficult to set a fastening torque of the thread within an adequate range. In addition, when a film thickness is large, a fastening resistance is induced. When a film thickness is small, a rotation prevention effect is reduced.

In contrast, in accordance with the present invention as recited in claims 10, 11, 16-18, and 20, the function of limiting a relative rotation is performed *after the threads are fastened*. For example, in the embodiment shown in Fig. 5 of the present application, the resin 132 is filled in the holes 129a, 139a, after a proper pre-load is applied by rotating the presser member 131. The solidified resin 13 performs the function of limiting a relative rotation. Accordingly, a pre-load and a rotation prevention allowance torque of the presser member 131 is controlled within an adequate range. (For clarification purposes, a detailed assembling is shown in the attached Figs. 1A to 1D.) Thus, Wallace fails to show or suggest the limiting a relative rotation being performed after the threads are fastened, as recited in independent claim 10, as amended.

In view of the above, Cheng and Wallace, whether considered separately or in combination, fail to show or suggest an electrically driven power steering apparatus as recited in amended claim 10. Accordingly, claim 10 is patentable over Cheng and Wallace. Claims 11, 16-18, and 20 are dependent on independent claim 10. Thus, claims 11, 16-18 and 20 are patentable over Cheng in view of Wallace for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 10, 12, and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of U.S. Patent No. 5,827,027, issued to Wakabayashi (“Wakabayashi”). Claim 10 has been amended in this reply to clarify the present invention recited. Claims 12 and 15 depend on claim 10. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Cheng fails to show or suggest the present invention as recited in claim 10. The lock nut of Cheng does not stop a relative rotation of the lock nut if a

thread thereof loosens. Cheng does not show or suggest a connecting device as recited in the claims. Additionally, Cheng fails to show or suggest the limiting a relative rotation being performed after the threads are fastened, as recited in independent claim 10, as amended.

Wakabayashi discloses a thread which is previously deformed. The deformed thread of Wakabayashi, however, performs a function of limiting a relative rotation *as the thread is fastened*. Therefore, it is difficult to set a rotation prevention allowance torque for the thread within an adequate range due to an excessive fastening torque. Additionally, when a deformation of the previously deformed thread is large, a fastening resistance is induced. When the deformation of the previously deformed thread is small, a rotation prevention effect is reduced. Further, when the rotation prevention force is given by an elastic deformation, a rotation prevention effect sufficient for the electric power steering apparatus can not be achieved.

In contrast, in accordance with the present invention as recited in claims 10, 12, and 15, a function of limiting a relative rotation is performed *after the threads are fastened*. For example, in the embodiment of Fig. 4 of the present application, a thin cylindrical portion 31b of the presser member 31 is caulked (plastically deformed), after a proper pre-load is applied by rotating the presser member 31. The deformed thin cylindrical portion 31b performs the function of limiting a relative rotation. Accordingly, a pre-load and a rotation prevention allowance torque of the presser member 31 are controlled within an adequate range. A deformation before fastening can make it impossible to fasten the thread. Therefore, a large deformation is limited. On the other hand, a deformation after fastening can provide a large deformation, because it is not necessary to further fasten the thread. This results in a loose prevention of relative rotation. (For clarification purposes, a detailed assembling is shown in

attached Figs. 2A-2D.) Thus, Wakabayashi fails to show or suggest limiting a relative rotation being performed after the threads are fastened, as recited in independent claim 10, as amended.

Cheng and Wakabayashi, whether considered separately or in combination, fail to show or suggest an electrically driven power steering apparatus as recited in amended claim 10. Accordingly, claim 10 is patentable over Cheng and Wakabayashi. Claims 10, 12, and 15 are dependent on independent claim 10. Thus, claims 10, 12 and 15 are patentable over Cheng in view of Wakabayashi for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 21, 22, and 24-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of Wakabayashi. Claim 21 has been amended in this reply to clarify the present invention recited. Claims 22 and 24-27 depend on claim 21. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

Claim 21 recites an electrically driven power steering apparatus comprising a presser member screwed to a ball screw nut for pressing a bearing against the ball screw nut. The presser member has a connecting device capable of limiting a relative rotation between the presser member and the ball screw nut by deforming at least one part of a thin cylindrical portion toward the ball screw nut. The function of limiting a relative rotation is performed after the threads are fastened.

As discussed above, both Cheng and Wakabayashi fail to show or suggest a presser member with a connecting device capable of limiting a relative rotation between the presser member and the ball screw nut by deforming at least one part of a thin cylindrical portion toward the ball screw nut, the function of limiting the relative rotation being performed after the

threads are fastened, as recited in independent claim 21, as amended. Accordingly, claim 21 is patentable over Cheng and Wakabayashi, whether considered separately or in combination. Claims 22 and 24-27 are dependent on claim 21. Thus, claims 22 and 24-27 are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of Wakabayashi, further in view of Wallace. Claim 23 depends on claim 21. Claim 21 has been amended in this reply to clarify the present invention recited. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

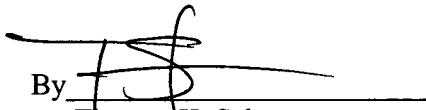
As discussed above, claim 21 is patentable over Cheng and Wakabayashi, whether considered separately or in combination. Also as discussed above, Wallace fails to show or suggest that which Cheng and Wakabayashi lack. Accordingly, claim 23 is patentable over Cheng, Wakabayashi, and Wallace, whether considered separately or in combination. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 10122/005002).

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Respectfully submitted,

By 

Thomas K. Scherer
Registration No.: 45,079
OSHA · LIANG LLP
1221 McKinney St., Suite 2800
Houston, Texas 77010
(713) 228-8600
(713) 228-8778 (Fax)
Attorney for Applicant

Attachments